upon which ice accumulates." Further, on page 2 of the application, numerous examples of vibrating type ice detectors are provided. Therefore, in view of the explicit definition of a vibrating type ice detector, as well as the provision of numerous examples of such vibrating type ice detectors, the phrase "vibrating type" is neither vague nor indefinite. Consequently, it is respectfully submitted that claims 1-4 satisfy the requirements of 35 U.S.C. §112, second paragraph. In view of this fact, it is respectfully requested that the rejection of these claims under 35 U.S.C. §112, second paragraph be withdrawn.

CLAIM REJECTIONS – 35 U.S.C. §§ 102 & 103

In the Office Action, claims 1-4 were also rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over, Hughes (U.S. Patent No. 3,541,540). Independent claim 1 is directed to a vibrating type ice detector, for providing a signal indicating ice formation, which includes a longitudinally extending probe and a surface roughness feature on a surface of the probe. As required in claim 1, "the surface roughness feature improving ice detection by lowering a static temperature of the probe at the surface roughness feature to accrete ice on the probe to thereby change the natural frequency of vibration of the probe." This limitation is neither taught nor suggested by the Hughes patent.

Hughes teaches a vibrating type ice detector having a longitudinally extending probe (designated for example at reference numbers 11, 22 and 31 in the FIGS. of that patent. In each embodiment disclosed by Hughes, a separate structure is positioned closely adjacent to the longitudinally extending probe. See for example, helix 12, rods 20 and 21, and canvas sleeve 30 shown in the Hughes patent FIGS. When ice builds up on the structure and the probe element to a thickness such that the ice on the probe element adheres to the structure or to the ice accretion on the structure, a substantial and sudden change in the resonant frequency of the probe, or a cessation of vibration altogether, occurs and ice is thereby detected. See for example Hughes at column 3, lines 30-44. Thus, it is ice accretion between the vibrating probe and a non-vibrating structure which results in ice detection in the Hughes patent.

The Office Action further asserts that the probe disclosed in Hughes has a flat probe tip. It is

respectfully submitted that this is not explicitly taught or suggested by the Hughes patent. However, even if the tips of the probes taught by Hughes are considered to be flat probe tips, there is no teaching or suggestion in Hughes that such a surface roughness feature would serve to impact or improve ice detection. Instead, Hughes makes clear the fact that ice detection occurs by ice accretion between the vibrating probe and the non-vibrating structure adjacent to the probe. Consequently, lacking a teaching or suggestion of the claimed feature of "a surface roughness feature on a surface of the probe, the surface roughness feature improving ice detection by lowering a static temperature of the probe at the surface roughness feature to accrete ice on the probe to thereby change the natural frequency of vibrations of the probe", it is respectfully submitted that the pending claims are allowable over this prior art reference. Withdraw of the rejection of claims 1-4 over the Hughes patent is therefore respectfully requested, along with allowance of these pending claims.

Also in the Office Action, claims 1-3 were rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as being obvious over, Marxer et al. (U.S. Patent No. 4,553,137). In support of the rejection, the Office Action stated that Marxer et al. teach a vibrating type ice detector having a longitudinal probe, excitation and sensing circuitry, and a surface roughness feature on the probe that improves ice detection by inherently lowering the static temperature of the probe at the surface roughness feature to accrete ice on the probe to thereby change the natural frequency of the vibration of the probe. The Office Action also states that the probe is substantially cylindrical. This interpretation of the Marxer et al. is respectfully traversed.

As shown in FIG. 2 of Marxer et al., the ice detector 14 disclosed in that patent includes a vibrating element 16 disposed in an air vehicle compartment 10. See Marxer et al. at column 2, lines 14-20. When ice becomes bonded to a cap 32 (also shown at reference number 12 in FIG. 1) it changes the natural resonant frequency of vibrating element 16 due to mass loading. While the Office Action states that the probe is a longitudinal and substantially cylindrical probe, there is no teaching or suggestion in the Marxer et al. patent that would support an interpretation that cap 32 provides such a longitudinally extending probe. Longitudinally extending vibrating element 16 is interior to ice detector 14, and therefore does not satisfy the surface roughness feature and ice

accretion requirements of the pending claims. Even if cap 32 is considered to be a longitudinally extending probe, there is no teaching or suggestion in the Marxer et al. patent that the cap includes any surface roughness features which would result in improved ice detection by lowering a static temperature of the probe at the surface roughness feature. Consequently, lacking any such teaching or suggestion, the Marxer et al. patent can neither anticipate nor render obvious the pending claims. Therefore, withdrawal of the rejection of claims 1-3 in view Marxer et al. is respectfully requested, along with reconsideration and allowance of all pending claims.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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